

# **Endangered Species Act** **COMPLIANCE**

## **881-HILLSIDE FRENCH DRAIN (881-HFD) PROJECT**

### **FINAL BIOLOGICAL SURVEY REPORT**

**DEPARTMENT OF ENERGY  
ROCKY FLATS OFFICE  
GOLDEN, CO**

**NOVEMBER 1991**

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**ADMIN RECORD**

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## 1 0 INTRODUCTION

Correspondence between the Department of Energy Rocky Flats Office (DOE RFO) and the U S Fish & Wildlife Service (USFWS) (dated 18 September 1991) identified several proposed remedial action and operational projects at RFP which may require official (Section 7) consultation with USFWS regarding potential impacts to resources protected under the Endangered Species Act (ESA) [16 U S C 1531 *et seq*]. Internal DOE RFO guidance further emphasized the need to insure compliance with applicable biological regulations regarding the 881 Hillside French Drain (881 HFD) project. On 19 September 1991 and 10 October 1991 DOE RFO met with USFWS Golden CO to discuss Rocky Flats Plant (RFP) compliance with the ESA.

This report is concerned with two classes of species one of which is a subset of the other.

**Species of Concern (SOC species)** T&E (see below) species plus those which are federal Category 1, 2 or 3 species, state threatened or endangered species, or state species of concern.

**Threatened & Endangered (T&E species)** are a subset of SOC species which includes only those listed (threatened or endangered) or proposed to list under federal regulations. These are the species to which the ESA directly applies and the ones injury to which could result in civil and/or criminal penalties.

At the meetings it was determined that consultation would be required on the 881 HFD project. To limit impacts to 881 HFD construction schedules DOE RFO requested that the consultation process be expedited. To facilitate expeditious consultation DOE RFO and USFWS agreed that DOE RFO would prepare a report summarizing ecological survey data pertinent to SOC species collected during (a) performance of the 881 Hillside Operable Unit 1 (OU1) Environmental Evaluation (EE) and (b) special surveys on the 881 HFD project site. USFWS visited the 881 HFD site; the visits took place on 26 September 1991 and 17 October 1991.

USFWS agreed to review the report to determine whether sufficient information had been collected to date to allow assessment of potential impacts to T&E species or their habitats in or near the 881 HFD project.

Furthermore DOE RFO is undertaking development of (a) an addition to the Ecology SOP to direct the identification, reporting, and support of T&E species observed at RFP and (b) a RFP sitewide procedure to govern compliance with ESA with respect to future facility and remediation projects. Both procedures are presently in draft form and under review by the Environmental Protection Agency (EPA), the Colorado Department of Health (CDH), USFWS, and the Colorado Division of Wildlife (CDOW).

## 2 0 DESCRIPTION

### 2 1 Project Description

Details of the 881 HFD Project are contained in the 881 Hillside, Operable Unit 1 Interim Remedial Action Plan (IRAP). In general, the excavation for the French Drain will extend along a section of the 881 Hillside to allow installation of a groundwater collection system. The excavation will vary in sections from 3 to 10 meters in depth and from 10 to 30 meters in width and extend for approximately 800m along an east-west transect. The location for the proposed project is shown in Drawing 1. The project will impact a total of about 2.8 hectares (approximately 7 acres).

## 2 2 Resource and Habitat Description

An updated list of SOC species which potentially exist at RFP is provided in Table 1 annotations show those with a documented presence at RFP and those with a documented presence at or near the project site

The Threatened and Endangered Species Evaluation Report, Rocky Flats Plant Site (April 4 1991) prepared by EG&G Rocky Flats Inc provides a broad picture of potential SOC species at RFP and provides the most recently published wetlands map habitat map and prairie dog colony map On 17 September 1991 USFWS transmitted to DOE RFO a list of additional SOC species these additional species were incorporated into Table 1 Also applicable to surveying for SOC species is the recent delineation of habitat types in an updated habitat map finalized on 08 November 1991

Habitat types to be disturbed include woodlands wetlands wet meadow short and tall marsh disturbed areas and mesic grasslands The primary habitat is highly disturbed and typified by successional and rehabilitation species Habitat types immediately adjacent to the 881 HFD project site include wet meadow short marsh mesic grassland rehabilitation and disturbed types Activities in and near the 881 HFD will affect approximately 2 8 hectares (approximately 7 acres)

## 3 0 SURVEY

### 3 1 Design

Methodologies used for ecological surveys at RFP are specified in the EG&G Environmental Management Department Standard Operating Procedures (SOP) Volume 5.0, Ecology These SOPs have been approved for use on CERCLA/RCRA investigations by EPA CDH USFWS and the CDOW Each Ecology SOP specifies a Master's Degree and two years of field experience as the minimum qualifications required of personnel conducting the surveys

### 3 2 On Site Inspection

RFP ecology field programs which began in spring 1991 include the (a) Threatened and Endangered Species Evaluation Report Rocky Flats Plant Site (b) Baseline Wildlife/Vegetation Studies (c) OU1 environmental evaluation (EE) (d) OU2 EE (e) OU5 EE and (f) surveys specific to the 881 HFD project site In the aggregate these programs cover a survey area bounded on the west by a line 0 3 mile east of Highway 93 on the east by Indiana Street on the north by Highway 128 and on the south by a line 0 5 to 1 0 miles north of Highway 72 Ecology surveys conducted within OU1 OU2 OU5 and OU fringe areas have more densely spaced sampling locations than do surveys conducted in OU reference and baseline areas

The following types of ecological surveys were conducted throughout 1991 at or near the 881 HFD project site

**Relative Abundance Transects** Three relative abundance transects (RA01A RW01A RG01A) were designed to sample fauna along the 881 Hillside about 200 meters above and below (parallel alignment) the French Drain Observations of the fauna in association with the three transects have been made monthly or bi monthly since May 1991 each observation session required about one hour to complete All observations of vertebrates and selected invertebrates (e g butterflies) were

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tallied and assigned to habitat types. Summaries were compiled in terms of species per unit time by habitat.

**Emilen Bird Transects** Twelve bird transects ranging in length from 100 to 1000 meters and totalling 3300 meters were configured within habitats adjacent to the project area along Woman Creek and the 881 Hillside. Data have been compiled from these transects five times since May. Each sampling session required ten minutes to more than an hour to complete depending upon the transect length and the number of birds present. Data were compiled on density of birds by season within habitat types.

**Small Mammal Transects** Nineteen 25 trap transects were specifically designed to sample populations of small mammals along Woman Creek and the 881 Hillside on either side of the French Drain. The sites were sampled over a four night period in mid May and again in late September for a total of 3800 trap nights.

**Vegetation Transects** Vegetation sampling was conducted in conjunction with the aforementioned bird and mammal transects within the ditch environment. Data have been compiled on vegetation cover, density, composition, richness, and production from 80 x 50 meter point intercept cover transects, 80 x 50 meter belt transects, and from 140 0.25 m<sup>2</sup> production plots. The vegetation along the alignment of the French Drain has been characterized and quantified using these techniques.

**Insect Sweep netting** Insect populations have been characterized by sweep netting the aforementioned mammal transects on three occasions from mid summer to early fall.

**Large Mammal Pellet Counts** Occurrence of deer and rabbits has been documented by counting pellet groups in conjunction with the sampling of small mammals at the sites previously enumerated.

**Fish Surveys** A minimum of two minnow traps were placed for a minimum of three nights at six sites on the South Interceptor Ditch in the spring and fall immediately adjacent to the 881 HFD project site in order to determine if any fish species were present (none were). Elaborate fisheries surveys were conducted in Ponds C 1, C 2, and eight sites along Woman Creek in order to characterize the ichthyofauna. Data were obtained on water chemistry, benthic macroinvertebrates, periphyton, and plankton in conjunction with these surveys.

### SOC Species Surveys (General)

- Δ Prairie Dog Surveys In accordance with USFWS guidelines and directives, surveys of prairie dogs have been conducted on a regular basis since February in order to ascertain the suitability of the RFP site for black footed ferrets. Three small prairie dog colonies have been delimited on suitable maps. About 40 person hours have been associated with this survey.
- Δ Raptor Surveys Intensive searches for habitat appropriate for raptor nests were conducted through the late winter, spring, and early summer. All observations of raptors have been recorded in a standardized format. These activities have consumed about 70 person hours.
- Δ Rare Plant Surveys From time to time throughout the growing season, surveys were conducted for SOC species within suitable habitats. Particular attention was paid to searching

suitable habitat for Lady's Tresses (*Spiranthes diluvialis*) the Colorado Butterfly Plant (*Gaura neomexicana*) and the Forktip Threewave (*Astrida basiramea*)

**SOC Species Surveys (Specific)** During the week of 7-11 October 1991 the phreatophytic zone of the SID and adjacent portions of Woman Creek and its tributaries were searched for SOC species with particular reference to the possible occurrence of *Spiranthes diluvialis*. The xeric and transition portions of the corridor were carefully examined for the possible occurrence of *Aristida basiramea*, *Gaura neomexicana* and other SOC plant species.

Minnow traps were placed at an additional four sites on the SID and an additional 11 sites on Woman Creek and its tributaries in an attempt to ascertain the status of the Common Shiner (*Notropis cornutus*) a Colorado State species of concern and the Plains Top Minnow (*Fundulus sciadicus*) a federal Category 2 species.

Additional traplines were established in late September and early October in OU5 to the west of the project area in an attempt to better ascertain the range of *Zapus hudsonius preblei*.

### 3.3 Interviews with Experts

EG&G has discussed the potential occurrence of *Spiranthes diluvialis*, *Aristida basiramea*, *Zapus hudsonius preblei*, *Gaura neomexicana* and other SOC species with Dr. Fred Harrington (Ebasco Services, Inc.) who currently serves as Field Supervisor for the sitewide biological baseline studies and for the OU1 EE. Dr. Harrington has in turn consulted with appropriate specialists in order to make a proper determination of the status of SOC species in or near the project site. Dr. Harrington has 32 years experience in ecosystem research, planning and management including extensive experience with T&E species management; his resume appears in Attachment A.

### 3.4 Literature Review

The Threatened and Endangered Species Evaluation Report, Rocky Flats Plant Site (April 4, 1991) provides a broad picture of potential SOC species at RFP and contains a literature review for those species. Literature searches have been performed for all of the additional species on the USFWS list (Table 1) and are included as Attachment 2 in Identification and Reporting of Threatened and Endangered and Special Concern Species, EMD Administrative Procedures Manual (3-21000 ADM) Procedure NEPA 12 (15 October 1991 draft).

## 4.0 RESULTS

These results represent ecological survey data collected between late winter 1991 and 11 October 1991 during the aforementioned surveys. They also include all documented findings of SOC species at RFP that might be impacted by the 881 HFD Project.

### 4.1 Presence of Compliance Listed Species

**Preble's Meadow Jumping Mouse** One individual assigned to this species (*Zapus hudsonius preblei*) a federal Category 2 species and a Colorado state species of concern was confirmed as having been captured and released in a rehabilitation habitat type transect (MR02A) about 50 meters south of the 881 HFD during the spring sampling season. Attempts to trap *Zapus* in the vicinity of the 881 HFD during the fall period were unsuccessful. This lack of success may have been due to (a) the

hibernation behavior of *Zapus* (b) competition from high fall populations of deer mice (*Peromyscus maniculatus*) and meadow voles (*Microtus pennsylvanicus*) who enter the traps more aggressively or (c) the actual absence of *Zapus* from the vicinity of the 881 HFD. Six individuals captured in the northern buffer zone in the spring were assigned to another non T&E species, the Western Jumping Mouse (*Zapus princeps*). However, determinations were tentative, based solely on external characteristics. None of these were captured in the northern zone during the fall. Since voucher specimens have not yet been taken, documentation of the respective distributions of *Z. princeps* and *Z. hudsonius preblei* remain to be ascertained.

**Black footed Ferret** Two small black tailed prairie dog colonies, about 1500 meters northeast and 2000 meters east of the 881 HFD, aggregated to about 10 and 5 hectares respectively. Each contained fewer than 40 individuals. The ferret (*Mustela nigripes*), a federal and state endangered species, may be associated with prairie dog colonies above a certain size. However, given the small size of these prairie dog colonies, it is extremely unlikely that *M. nigripes* is present.

**Forktip Threeweed** This species (*Aristida basiramea*), a Colorado State species of concern, has been found just south of the west access road entering Rocky Flats, growing on gravel scars bordering an old roadway 1000 meters to the west of the 881 HFD. This gravel habitat can apparently support the species when other plants are absent and adequate moisture can accumulate. Given these habitat preferences, it is highly unlikely that this species would be found in the 881 HFD and none have been observed there.

**Diluvium Lady's Tresses** Appropriate habitat for the diluvium lady's tresses (*Spiranthes diluvialis*), a federal proposed endangered species and a Colorado state species of concern, includes the edge of wetlands dominated by sedges, rushes, and cattails. Populations of the plant have been found in Jefferson and Boulder Counties on either side of the RFP site. There is a small wetland area within the 881 HFD project area that may be suitable habitat for this species. However, an extensive search during the flowering period (reported as extending from early July to early October) of this species in the wetland area of the 881 HFD yielded negative results.

**Colorado Butterfly Plant** Appropriate habitat for the Colorado butterfly plant (*Gaura neomexicana* var. *coloradensis*), a federal Category 2 species and a Colorado state species of concern, includes the transition zone between wetland bottoms and the drier uplands associated with wet meadow habitat. Given that there is suitable habitat for this species adjacent to the 881 HFD, there was a reasonable probability that the species might be found on the project site. However, an extensive search during the flowering period (reported as extending from early July to late September) of this species throughout the 881 HFD project area yielded negative results.

**Bald Eagle** Individuals of this species (*Haliaeetus leucocephalus*), a federal and state endangered species, have been observed soaring over the developed area and flying over the northeast portion of the buffer zone. None have been observed to roost or hunt on RFP and none have been observed in proximity to the 881 HFD.

**Peregrine Falcon** Two individuals of this species (*Falco peregrinus*), a federal and state endangered species, were observed at RFP in early fall. One was flying from west to east near the west gate. The other was observed perched on a powerline near Pond B 5 and made an attempt to capture a killdeer inbound to Pond B 5. The Peregrine Falcon Recovery Plan discourages land use practices and development which may adversely alter the character of the hunting habitat or prey base within a 10 mile radius of a nesting cliff. As there are two such cliffs within five and seven miles of RFP,

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the entire plant site is within the area of protection of potential foraging habitat. However, no nesting activities have been observed at RFP and no nesting or foraging activities have been observed on or in proximity to the 881 HFD.

**Ferruginous Hawk** This species (*Buteo regalis*) a federal Category 2 species and a Colorado state species of concern was observed adjacent to the 881 HFD in winter, spring, and early summer. A juvenile male was resident in the vicinity in the area for a six week period in early late spring and early summer. Nesting was not documented. This individual was observed hunting primarily in the riparian zone of Woman Creek and along the 881 Hillside directly above the French Drain project site. Most observations of this species have been in association with prairie dog colonies southeast of RFP.

**Swainson's Hawk** A pair of this species (*Buteo swainsonii*) a federal Category 3C species attempted to nest in early June in a cottonwood about 1000 meters southeast of the 881 HFD. The nest was abandoned for unknown reasons in early July. During this period, members of the pair were not observed hunting in the vicinity of the 881 HFD, although other observations of this species have been documented infrequently but widely on the RFP site.

**Other** No additional SOC species are expected to occur with any degree of regularity in association with the 881 HFD project site.

### 4.2 Presence of Critical Habitat

No T&E species have been documented in or near the project site and the majority of the 2.8 hectares comprising the project site should not be considered as critical to T&E species.

## 5.0 ANALYSIS OF POTENTIAL IMPACTS

### 5.1 Direct Impacts

Habitats (including wetlands) at the location of the 881 HFD Project will be totally destroyed during excavation. The small, approximately 1200 m<sup>2</sup> habitat group (two stands of trees, 10 trunks in one, eight in the other, average diameter at breast height (DBH) = 30 cm and approximately 600 m<sup>2</sup> of willows, cattails, and rushes) above the western end of the French Drain alignment will be completely removed by the project. This is fairly unique habitat within the Woman Creek drainage and is known to support as many as 14 species of migratory birds both for nesting and foraging. Impacts to the grassland and wetland areas along the project alignment may be potentially harmful to the migratory birds utilizing the area.

Although the small wetland habitat in the 881 HFD does not represent a substantial portion of the total wetland habitat present at RFP, they comprise none the less a man-made jurisdictional wetland as defined in 33 CFR 328.3(b) and 40 CFR 230.3(t). This wetland is shown on the maps prepared for the Wetlands Assessment, Rock Flats Plant Site (01 April 1991). As the 881 HFD project is new construction, wetland impacts would not qualify for exclusion under 10 CFR 1022.5(g). Construction projects affecting wetlands not discussed in the September 1977 RFP EIS are subject to the requirements of 10 CFR 1022.

### 5.2 Indirect Impacts

The excavation activities could have an adverse impact on the dynamics of jumping mouse populations living adjacent to the southern edge of the construction site. As a general rule, there should be no earth-disturbing activities within 200 meters of *Zapus* nesting areas. These nesting areas are



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estimated to be in the vicinity of the MR02A capture location 50 m south of the project. While it is difficult to predict the magnitude and types of impacts to this species (and perhaps other SOC species) due to vibration, noise, and other physical disturbances emanating from construction activities, attention has to be called to the fact that such impacts could occur.

The possibility exists for increased sedimentation into Woman Creek from excavation activities at the French Drain Project. Due to the shallow nature of the creek, even a small increase in sedimentation levels could greatly affect the macrobenthos and fish populations in the creek. Seven non SOC species of fish have been identified in Woman Creek: Stoneroller (*Campestenus anomalus*), Creek Chub (*Semotilus atromaculatus*), Golden Shiner (*Notemigonus crysoleucas*), Fathead Minnow (*Pimephales promelas*), Largemouth Bass (*Micropterus salmoides*), Green Sunfish (*Lepomis cyanellus*), and the Western White Sucker (*Catostomus commersoni*). The two SOC fish species that could be present at RFP are the Common Shiner (*Notropis cornutus*), a Colorado State species of concern, and the Plains Topminnow (*Fundulus sciadicus*), a federal Category 2 species, have yet to be observed in Woman Creek.

Disturbance of the land around the 881 HFD due to excavation activities could lead to the invasion of opportunistic plant species that are less desirable as forage for small mammal and bird populations.

Although Woman Creek gains and loses water to and from alluvial materials along its length and is part of a complex, poorly characterized hydrologic regime, it has been suggested that installation of the French Drain could restrict or eliminate recharge of a significant portion of the creek drainage from the 881 Hillside, including that portion of the creek which may harbor a *Zapus* population. Since the 881 Hillside French Drain system is designed to intercept groundwater flowing through alluvial materials, it is anticipated that its construction will decrease the flow of water through these materials downslope of the Drain. However, following treatment, water extracted from the French Drain will be discharged into the western end of the South Interceptor Ditch, just up slope of Woman Creek. Given that downslope seepage from the Ditch has already been observed, it is anticipated that water entering the Ditch will reach the creek and essentially make up any recharge flows originally diverted by the French Drain.

### 5.3 Cumulative Impacts

Immediately to the west of the 881 HFD project site, in the upper Woman Creek drainage, are the Old Landfill and Ashpits sites which are scheduled for remediation; however, specific actions for remediation of these sites have yet to be determined. The potential for cumulative impacts to SOC species, either from 881 HFD excavation activities, other projects along Woman Creek, or South Interceptor Ditch maintenance, certainly exists. However, sufficient information is not presently available to fully verify the existence or characterize the extent of cumulative impacts.

### 5.4 Platte River Hydrology

In order to avoid impacts to T&E species in Nebraska that are dependent upon downstream flows, water-related projects at RFP must demonstrate a zero net depletion to the Platte River basin.

Under the original design for the French Drain Treatment Facility (FDTF), approximately 5000 gallons per week of the water extracted from the French Drain would have been used as process water to back flush the ion exchange columns. This contaminated flush water would then have been removed from the FDTF, pumped to the Solar Ponds, and lost through evaporation. Although losses would have varied depending upon ambient air temperature and humidity, they could have averaged approximately 0.8 af/year, well in excess of the 0.1 af/year cutoff suggested by the USFWS. To prevent this evaporative loss

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from occurring operating procedures for the FDTF will be altered so that back flush water is taken from plant raw water sources no mechanical modification of the FDTF will be required

The potential loss of back flush water was not directly related to the daily operation of the FDTF. With the exception of the UV system and the holding tank vents the FDTF is a closed system and evaporative losses from it can be shown by calculation to be significantly less than 0.1 af/year. Such minimal evaporative losses can be fully mitigated by the injection of additional make up water as required. Due to these operational changes in the FDTF there will be no net loss of water to either Woman Creek or the Platte River as a result of the operation of the French Drain.

### 6.0 DETERMINATION

General and focused surveys have found no evidence of T&E species on or in proximity to the 881 HFD project site.

Based on the data currently available DOE RFO has determined that excavation of the 881 HFD could have adverse direct, indirect, or cumulative impacts on SOC species in or near the project.

Based on the data currently available DOE RFO anticipates that construction of the 881 HFD will cause no net depletion to the Platte River basin and no impacts to the hydrologic regime in Woman Creek.

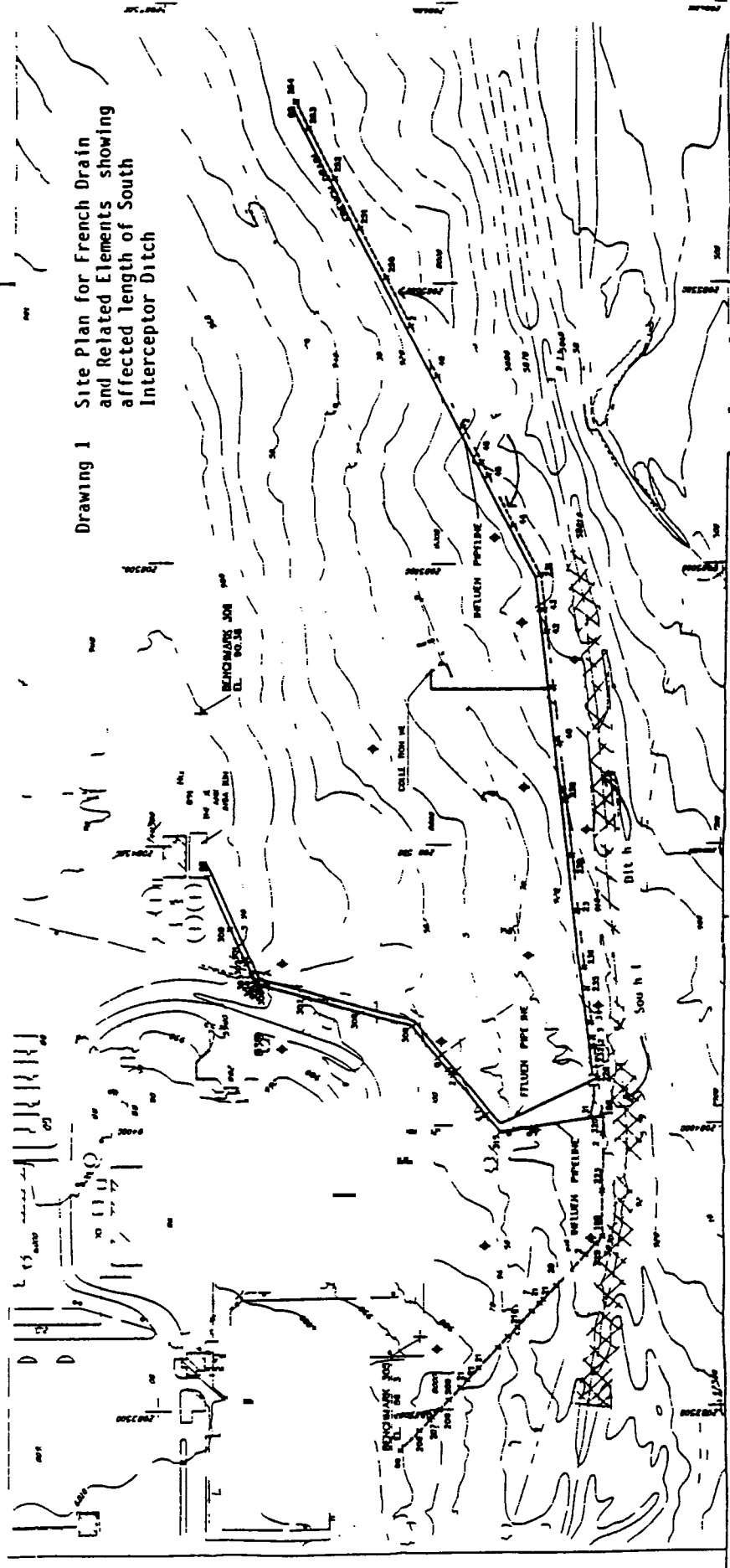
Based on the data currently available DOE RFO has determined that any activity involving impacts to the small wetland habitat are subject to the requirements of 10 CFR 1022.1.

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1) Prepared by EG&G Rocky Flats EM/NEPA Division (303) 273 6188. Report originally compiled and written by Ms. Meredith L. Brogden, re-written and edited by Dr. Bruce K. Hope, reviewed by Mr. Bruce J. Bevir, Dr. Fred Harrington, Mr. Scott McGlochin, and Dr. Lawrence E. Woods. Platte River hydrology analysis provided by Mr. Eric Mendes, EG&G Rocky Flats EM/Surface Water Division. Information on the types and results of surveys conducted were transcribed from a report (Letter RFEV3 EDEN EGRF M 015) prepared by Dr. D. Jean Tate (Ebasco Services) and Dr. Fred Harrington (Ebasco Services) under EM/NEPA Division Contract BA64980EB.

<b>SOC SPECIES COMPLIANCE LIST &amp; HABITAT PREFERENCE (881 HFD)</b>					
<b>TABLE 1</b>					

Drawing 1 Site Plan for French Drain  
and Related Elements showing  
affected length of South  
Interceptor Ditch



## ATTACHMENT A

### HARRINGTON, FRED A

Biologist

#### PROFESSIONAL SUMMARY

Dr Harrington has 32 years of professional experience in the energy and natural resources fields. He has performed a wide range of services including endangered species management, mine land planning, permitting and reclamation, baseline and monitoring studies, mitigation planning, regulatory reviews and fatal flaw evaluations, parks and reserves planning, design and management, and a wide range of land use planning activities. He has served as project manager and principal investigator on projects throughout the Rocky Mountain region, Northern Great Plains, Pacific Northwest, Desert Southwest, and has worked for extended periods in Latin America and the Middle East. He is currently engaged in hazardous waste remedial investigations and related projects with the Department of Energy and the U S Army.

Dr Harrington serves as Field Operations Leader for the Rocky Flats Plant biota baseline study under the Environmental Restoration Program and the Environmental Evaluation of Operable Unit (OU) 1. He has played a major role in developing standard operating procedures for biota investigations.

#### EDUCATION

Ph D Wildlife Biology Colorado State University 1978  
M S Natural Resources Administration Colorado State University 1969  
B S Wildlife Biology Colorado State University 1959  
Biology University of New Mexico 1955-56

#### ADDITIONAL TRAINING

Health and Safety Training Course 40 hours 1990  
Industrial Ecology Institute Colorado School of Mines 1980  
Business Administration Short Courses Harvard/University of Tehran 1973-75  
Alpine Ecology Summer Seminars University of Colorado 1966-1969  
Business Administration University of Maryland USAFI 1964-1965

Dr Harrington has organized and attended a very large number of conferences, conventions, and seminars that included topics in industrial ecology, ecological guidelines for land use, marine biology, endangered species management, mitigation, parks and reserves, and international conservation issues.

#### REGISTRATIONS AND CERTIFICATIONS

Registered Ecologist Registry of the International Union for the Conservation of Nature and Natural Resources  
Certified International Diver Professional Association of Diving Instructors  
Certified Flight Instructor (Airplane and Instruments) FAA  
Certified Ground Instructor (Advanced and Instruments) FAA  
Airline Transport Pilot Rating (Multi-engine) FAA

## PROFESSIONAL AFFILIATIONS OR MEMBERSHIPS

Sigma Xi Ecological Society of America, American Society of Mammalogists American Ornithological Union Society for Range Management Wildlife Society International Union for the Conservation of Nature and Natural Resources American Institute of Biological Science Survival Service Commission

## SECURITY CLEARANCES

Rocky Flats Red Badge  
Department of Energy Q Clearance Pending

## EBASCO EXPERIENCE

Dr Harrington joined EBASCO in 1990 He participates in a wide range of projects including the Rocky Mountain Arsenal (RMA) Hazardous Waste Remedial Investigation/Feasibility Study for the U S Army Program Manager's Office for the RMA Contamination Cleanup and the Rocky Flats Plant Monitoring Program for the Department of Energy (DOE) He is currently assigned as Field Operations Leader for the Rocky Flats Plant biota baseline study and for the Environmental Evaluation of OU 1

## THREATENED AND ENDANGERED SPECIES EXPERIENCE

As an advisor to the Survival Service Commission (SSC) of the International Union for the Conservation of Nature and Natural Resources (IUCN) Dr Harrington played a major role in the creation and passage of CITES (Convention in Threatened and Endangered Species of Flora and Fauna) to which the United States and a majority of nations are now signatories

As chief advisor to the Iran Department of the Environment (under the former Shah) Dr Harrington was credited with developing a successful recovery plan for the Persian Fallow Deer the world's rarest deer He subsequently served with SSC's Deer Group in formulating recovery plans for other species of endangered cervids He worked with IUCN International Waterfowl Research Group (IWRG) International Council for Bird Preservation the Soviet Union Iran and the International Crane Foundation in developing a recovery plan for the Siberian White Crane the Eurasian counterpart of the Whooping Crane He was credited with organizing the Ramsar Conference which led to ratification of the MARR list, protecting wetlands of international concern throughout Eurasia

He developed a management plan for endangered bustards in the Middle East and was the first to raise Great Bustards successfully in captivity He was involved in successful endangered species planning and management for the Marsh Crocodile Caspian Snow Cock Caspian Salmon (a race of Brown Trout) and sea turtles in the Persian Gulf

Dr Harrington was engaged as an advisor by several other Middle Eastern nations including Bahrain Pakistan and Saudi Arabia He worked with the Government of Oman to develop nature preserves for the endangered Arabian Tahr and Muscat Gazelle

Upon returning to the United States in 1979 Dr Harrington served as consultant and acting Western Regional Land Steward for the Nature Conservancy San Francisco In that capacity he was responsible for endangered species planning and management in the Conservancy's eighty western preserves He prepared master plans that included endangered species recovery plans for Sycan Marsh Oregon (Greater Sandhill Cranes) Pine Butte Swamp Montana (Grizzly Bears) Silver Creek Idaho (McCloud Rainbow Trout)

Daudrich Northern Desert Shrub Reserve Idaho (endangered ecosystems) Birds-of Prey Reserve Idaho (falcons) Gila River Riparian Reserve New Mexico (endangered ecosystem) Dixon Dozier Sanctuary California (valley grassland vernal pools endangered flora, endangered invertebrates) Kipahulu Valley Maui Hawaii (endangered flora and birds) and many others

As a private consultant in recent years Dr Harrington has prepared dozens of endangered species evaluations and mitigation and management plans for government and industry He was responsible for preparation of the Trinity River Wildlife Management Options Study (Mitigation Planning) for the Bureau of Reclamation.

Dr Harrington has worked with the Commission of the Californias in preparation of plans for rare flora and fauna in Baja California Similarly he has worked with the Secretaria de Desarrollo Urbano y Ecologia (SEDUE) the Universities of Chiapas and Colima Earthwatch and the Institute for World Conservation and Development in planning for endangered species in Tamaulipas (oak/sweetgum biotic community ecology) Siankaan Biosphere Reserve Quintana Roo (coral reefs estuaries American crocodiles rare avifauna spider monkeys) Lagos de Montebello Chiapas (quetzals and orchids) Maruata Michoacan (spawning sea turtles) Zitacuaro Michoacan (wintering Monarch Butterflies) and other sites

## **PRIOR EXPERIENCE**

### **Fred Harrington and Associates**

Consulting Biologist and CEO (9 years)

Dr Harrington supervised a group of professional biologists and land use management specialists who offered a wide range of services including environmental services land use planning and biological studies During this period he served as project manager and principal investigator on numerous major energy projects in the Northern Great Plains and Rocky Mountain region including the Garrison Coal Field Powder River Basin and elsewhere on behalf of the coal and uranium industries Likewise he has worked with federal agency programs in the completion of extensive wildlife and vegetation inventories for the Bureau of Land Management He coordinated an abandoned mine land reclamation project under contract to Wyoming Department of Environmental Quality Dr Harrington and his colleagues were engaged by a large number of nonprofit conservation organizations including the Nature Conservancy The Institute for World Conservation and Development and the International Union for Conservation of Nature and Natural Resources In recent years Dr Harrington devoted considerable time to investigations of the tropical rain forest degradation phenomenon throughout Latin America

### **VTN Wyoming Incorporated**

Manager of Environmental Sciences (2 years)

For this multidisciplinary company Dr Harrington was responsible for program development, budget and finance marketing and quality control Principal activities were associated with environmental impact assessments in the Powder River Basin and adjacent areas Dr Harrington served to coordinate the activities of biologists sociologists geologists soil scientists economists archaeologists and several engineering disciplines He served as principal investigator on a variety of projects in the Northern Great Plains and Rocky Mountain region He played a major role in the Bureau of Reclamation's Trinity River (California) Management Options Study He conducted the first environmental feasibility study for coal pipelines in the region

**Iran Department of the Environment**  
**Chief Advisor (7 years)**

Dr Harrington was employed by the Iranian government (under the former Shah) to supervise and conduct environmental studies. Shortly thereafter he was given responsibility for preparation of the Iran National Report to the Stockholm International Conference on the Human Environment (UNEP UNDP UNESCO 1971). As a result of the favorable response to the report by the conferees he was asked to present plans for creation of the Iran Department of the Environment. Plans were approved by Parliament in 1972. He was authorized to recruit 44 foreign advisors in the field of environmental conservation to assist in developing the program. He subsequently guided the development of an organization with jurisdiction over environmental protection and pollution abatement, national parks and reserves, fisheries, wildlife, plant protection, and national museums. He supervised the first studies of oil pollution in the Persian Gulf and proposed the first pollution abatement facilities at Iranian ports. He conducted the first studies of pesticides in the Caspian Sea which led to a bilateral agreement on pesticide control and regulation between Iran and the Soviet Union. Dr Harrington was innovator of Pardisan, a nature park complex near Tehran, where he worked with such famous architects as Ian McHarg and R. Buckminster Fuller. The master plan won the annual award at the American Association of Landscape Architects in 1977.

**OTHER EXPERIENCE**

Dr Harrington began his career as a biologist for New Mexico Game and Fish Department working on a federal aid project, Investigations of Big Game and Ranges. He served 5 years as Flight Navigator in the U.S. Air Force, attaining the rank of Captain. During that period he was assigned to Military Airlift Command and served as a combat aircrew member in Vietnam in aeromedical evacuation and transport squadrons. When he returned to graduate school, he was engaged by the National Park Service to study habitat preferences of large mammals in Rocky Mountain National Park. For his efforts he was granted the Hibbs Award for Outstanding Contribution to Wildlife Management in the State of Colorado.